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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

New Soviet Initiatives in Communications Satellites and Television

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence

INTELLIGENCE MEMORANDUM

New Soviet Initiatives in Communications Satellites and Television

Summary

Major Soviet initiatives are under way in communications satellite (comsat) systems and television broadcasting. Domestically, the USSR is undertaking a crash expansion of TV coverage in time for the fiftieth anniversary of the Bolshevik Revolution. Costing about US $140 million, this effort has two main elements, designed to catch foreign as well as domestic attention. One is the creation of a system of about 20 new ground stations (see the photograph) to be used with the Molniya comsats in relaying and distributing Moscow-originated telecasts to the remotest corners of the USSR. The other is the completion of a new TV transmission complex in Moscow, featuring the Ostankino television tower, an architectural showpiece that ranks as the tallest building in the world.

The completion of the new ground stations (Orbita) will permit the USSR to claim a lead over the United States in developing a nationwide system of TV distribution by comsats. Although initially capable only of TV

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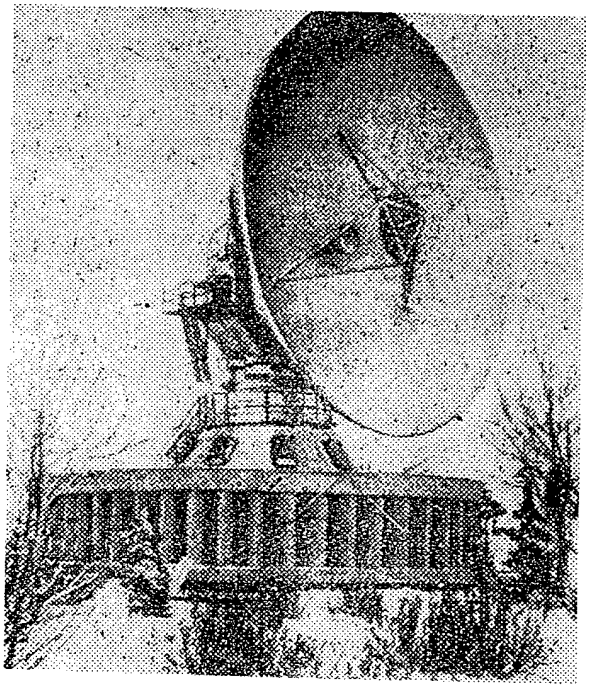
reception, the stations can be modified to handle two-way television, telephone, and telegraph traffic. When this occurs, probably within the next few years for at least some stations, the USSR will have substantially upgraded strategic communications in its eastern and northern regions.

At the international level, the USSR agreed to and then, owing to repercussions of the Arab-Israeli war, withdrew from participation in a live global TV spectacular scheduled for 25 June 1967, using a Molniya satellite and three satellites operated by the International Telecommunications Satellite Consortium (Intelsat). This would have been the first case of operational cooperation between the two systems. Moving in yet another direction, the USSR recently issued an invitation for both Communist and non-Communist nations to join in forming a new international comsat organization. These Soviet moves appear to be designed to show that the USSR, although receptive to international cooperation on an ad hoc basis, is unwilling to join Intelsat, an organization which it feels is subordinated to US interests.



ORBITA COMMUNICATIONS SATELLITE
GROUND STATION

Introduction

1. The fiftieth anniversary of the Bolshevik Revolution has provided a focus for major new moves by the USSR in the fields of communications satellite (comsat) systems and TV broadcasting. Although the main thrust of these moves is aimed at improving communications services within the USSR, some of them clearly dovetail with Soviet foreign policy and propaganda objectives.

2. This memorandum first outlines the scope of current initiatives by the USSR to expand Soviet comsat and TV broadcast capabilities, both domestic and international. Second, it examines the international implications of the Soviet program, with special reference to its propaganda potential and to the emergence of new facets in the relationship between the USSR and the International Telecommunications Satellite Consortium (Intelsat). Finally, the memorandum considers the likely effects of the expansion program on internal telecommunications in the USSR, including Soviet strategic communications.

The Crash Domestic TV Program via Comsats

3. Currently, the USSR is making intensive preparations to highlight the fiftieth anniversary of the Bolshevik Revolution -- the so-called Jubilee Year -- to be celebrated this coming autumn. Among these preparations, the most striking in terms of financial and technical effort is a crash program to provide major expansion of TV coverage in the USSR in time for the November celebrations. Costing about US $140 million, this program contains two features designed to rivet the attention of foreign as well as domestic observers. One is the creation of a comsat system capable of relaying and distributing Moscow-originated telecasts to the remotest corners of the USSR. The other is completion of a new TV transmitting complex in Moscow that includes the tallest building in the world.

Orbita Satellite Ground Stations

4. In planning for the celebration of the fiftieth anniversary, Soviet authorities were faced with a serious communications problem. The USSR has developed one of the most elaborate domestic radio broadcasting systems in the world, but its television -- a medium of far greater impact on the average citizen -- has lagged far behind. As of 1965, "live" TV programs from Moscow could reach only about one-third of the USSR landmass and could be seen by only 50 million to 70 million Soviet citizens -- most of them living west of the Urals.

5. In part, this situation resulted from a shortage of TV receivers (in 1965 there were only about 7 sets for every 100 Soviet citizens). In the USSR, however, this problem has traditionally been mitigated by installing receivers for group viewing. The most serious limitation on nationwide network telecasting from Moscow has been the lack of long-haul transmission media capable of carrying television to population centers in the eastern and northern regions of the USSR.

6. In early 1966, authorities in Moscow disclosed through the press that central TV coverage of the fiftieth anniversary would be extended to the more remote regions of the USSR through the use of comsat technology. For the space segment, the system was to use the Soviet "Molniya" satellite, two of which by then had been successfully used to relay both TV and communication traffic between Moscow and Vladivostok. The new ground segment, which soon became the subject of widespread Soviet publicity, was to consist of a network of so-called Orbita stations, located in population centers dispersed widely throughout the Soviet eastern and northern regions.

7. The Orbita construction program, which currently provides for 20 stations, now has been under way

for almost 15 months. Thus far, the location of 18 stations has been firmly established (see Figure 1). Those responsible for installing the stations clearly are under official pressure to have them completed in time for the November celebrations. Although there is evidence of problems in construction and installation at some of the sites, virtually all of them will probably be ready by the deadline.

8. For initial operations, the Orbita stations apparently are designed only for the reception of a single TV channel. In their current configuration, they will not have the capability to transmit television nor will they be able to accommodate telephone and telegraph traffic. Physically, the stations consist of circular buildings about 50 feet in diameter, each supporting a single 40-foot dish antenna (see the photograph, following the Summary). The antenna system, weighing 54 tons, is described by Moscow as "very expensive, highly complicated, and among the latest achievements of Soviet science." For tracking the satellites moving across the sky, the Orbita antennas have been made fully steerable, which greatly adds to building and maintenance costs.

9. When completed, the ground stations will represent an estimated initial investment of at least US $30 million, or an average of about US $1.5 million per station. Precise cost estimates are not possible, not only because firm price data are fragmentary but also because construction costs in the USSR vary widely depending on the geographical location of the installation. Owing to the high power of the Molniya satellite's transmitters -- currently several times higher than the power of Intelsat transmitters -- the Orbita ground stations are smaller, less complex, and less expensive than would otherwise be necessary. Modification of these stations to accommodate two-way communications traffic as well as television would increase their cost substantially, possibly by 100 percent or more.

The Molniya Satellites

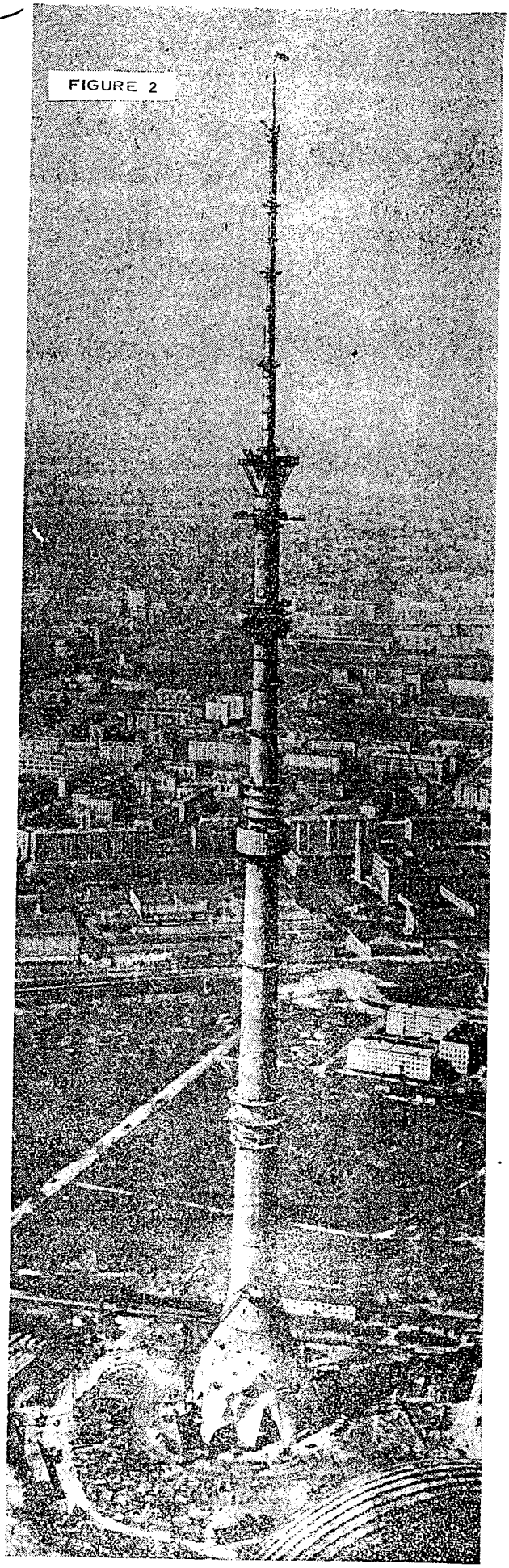
10. Since April 1965 the USSR has placed five Molniya communications satellites into highly elliptical orbits, most recently on 25 May 1967. Each of these Molniya comsats has relayed television or, alternatively, 60 channels of communications traffic. Except for test TV transmissions between Moscow and Paris, these relays have been exclusively between Moscow and Vladivostok.

11. In the orbit chosen, three active Molniya satellites would be sufficient to provide 24-hour coverage of the USSR; indications are, however, that the active lifetime of the first three Molniyas was short owing to the effects of radiation on unshielded components. Recent evidence indicates that the USSR has taken steps to solve this problem. Although the USSR has cautiously labeled even the fifth Molniya as "experimental," it is likely that the system is now moving rapidly toward full operational status. It is possible that yet another Molniya-class satellite will be orbited before the Orbita ground stations begin operation in the latter half of 1967.

The All-Union TV Center

12. Concurrently with the Orbita TV distribution network, the USSR is rushing the completion of a TV transmission and studio complex that is without parallel in the Western world. The dominant feature of this complex, known as the All-Union TV Center, is a mammoth transmission tower 1,760 feet high, including a 490-foot antenna (see Figure 2). Without its antenna, the ferro-concrete tower is

FIGURE 2



slightly taller than the Empire State Building. The Center is located in the Ostankino suburb of Moscow and has been under construction since 1961. Over the past year or so, Soviet authorities have pushed hard on this showpiece project in an effort to have it operational in time for the Anniversary celebrations.

13. The Center is being equipped with 18 large studios and five 50-kilowatt TV transmitters. It is designed to serve as a national facility for TV programing, production, and transmission -- the Soviet version of CBS, NBC, and ABC in New York rolled into one. Soviet planning calls for the All-Union Center eventually to telecast 40 hours per day on five channels, about two and one-half times Moscow's current TV output of 16 to 17 hours a day on three channels. The effective radius of direct telecasting from the Center will be 100 miles, compared with only 25 to 35 miles for existing Moscow facilities. One of the Center's channels will be networked to all regions of the USSR. Reliable estimates place the full cost of the new complex at about US $110 million.

External Aspect of Soviet Comsat Policy

14. When Intelsat was chartered under the Interim Agreement of 1964 to establish a single global comsat system, the USSR rejected an invitation to join, charging that it was a capitalistic venture subordinated to US interests. A major reason for the Soviet objection is the fact that the Intelsat charter made ownership of the space segment directly proportionate to a member nation's share of international communications traffic, which gave the United States a 60.5 percent interest and the USSR only 1.5 percent.

15. Until the USSR successfully orbited its own Molniya satellites in 1965, it insisted that any international comsat system be controlled by the UN. Since proving out the Molniyas, however, the USSR has

muffled the UN theme, and is now moving ahead in several directions with an international comsat policy of its own.

16. As its initial move, the USSR invited both France and Japan to participate in testing Molniya's international relay capabilities with the ground stations they had built for use with Intelsat satellites. Japan declined but France, which was then engaged in a promising effort to sell its SECAM color TV system to the USSR, agreed. As a result, the Molniya satellite was used in both November 1965 and May 1966 to relay color TV test transmissions between Moscow and the French ground station at Pleumeur Bodou.

17. At about this same time the USSR reportedly undertook to expand its role in the international comsat business by offering ground stations to certain of the less developed countries. Although such rumors could not be confirmed at the time, it was announced in December 1966 that the USSR had made a firm commitment to assist in the installation and maintenance of a comsat ground station in Cuba. In the same month, the UAR announced Soviet agreement to establish a comsat ground station in Egypt. Thus far, however, no construction schedules have been announced, and there is no firm evidence as to whether these stations are to be of the Orbita type (TV reception only) or equipped to provide the full range of two-way communications services.

18. Thus, to date, Moscow's efforts to internationalize Soviet achievements in comsat technology have brought concrete results in only three nations outside the European Communist Bloc. Significantly, however, two of the three (France and the UAR) are signatories of Intelsat, one of whose fundamental concepts has been that all members would be committed to a single global system.

19. Apparently confident that the time was ripe, both politically and technologically, the USSR moved recently to expand its horizons in the field of international comsat diplomacy. At the conclusion of a meeting of Communist countries in April 1967, the USSR drafted a communiqué inviting both Communist and non-Communist countries to join with it in forming an independent international comsat system. Although Moscow-authorized communiqués of this type are typically ambiguous as to firm commitment and planning, it is more than likely that Soviet ambassadors in a number of foreign capitals have been instructed to play up this theme.

20. Despite its fundamental opposition to the ground rules under which Intelsat currently operates, the USSR has apparently adopted a more flexible stance in its relationship with the Consortium. From 1964 through 1966 the USSR refused to involve itself directly with Intelsat facilities (Intelsat controls only the satellites; ground stations in the system are nationally owned). In 1967, however, the USSR relaxed this attitude. In connection with the inauguration of direct air service between Moscow and Tokyo in April, it allowed live telecasting of the ceremonies to be relayed between the two capitals via Intelsat satellites.

21. Of much greater interest, however, is a live global TV spectacular scheduled for 25 June. During this telecast the Soviet Molniya system would have been operationally linked to that of Intelsat for the first time.* As planned, the TV special was to

* On 21 June, the USSR withdrew its commitment to participate in the global telecast on the grounds that Western TV stations were "conducting a smear campaign against Arab countries and the peaceful policy of the Soviet Union and other socialist states."

have used four satellites, one a Molniya and three operated by Intelsat. The Soviet satellite was scheduled to provide direct relay within the USSR between Moscow and Vladivostok. Transmissions to and from the USSR were to be carried via terrestrial lines between Moscow and Brussels. The three Intelsat satellites will provide relay between Europe, North America, and Asia.* The stimulus for this global spectacular came from the BBC, but the telecast itself is under the official sponsorship of the European Broadcasting Union. The promoters predict that the telecast could have a viewing audience of 700 million people on five continents.

Implications

22. Current Soviet initiatives in the sphere of comsats and television have several implications. Once the network of Orbita ground stations becomes operational, and perhaps before,the USSR is likely to claim a technological lead over the United States in developing a national system of TV distribution by satellite. The USSR will probably also boast that its actions have conferred the benefits of comsat technology on the Soviet population while the government and industry in the US are still debating the issue.** Soviet claims will almost certainly ignore the fact that excellent terrestrial telecommunications systems in the US and many other Western countries make the need for TV distribution by satellite less than urgent.

23. Soviet tactics toward Intelsat appear to be shifting from unrelieved hostility to a more pragmatic

* Transmission across and distribution within the continental US is being sponsored by the National Educational Television network.

** Initially, the number of Soviet citizens living within effective reception radius of the Orbita stations will range somewhere between five million and ten million.

"carrot and stick" approach. On the one hand, the televising of the recent inaugural of Moscow-Tokyo air service and the initial agreement to participate in the global TV spectacular were probably intended to show that cooperation between the USSR and the Consortium is possible for specific purposes on specific occasions. Moscow may also be trying to lay the groundwork for using Intelsat facilities in relaying the Anniversary celebrations to the West, and possibly the 1968 Olympics to the USSR. On the other hand, by first agreeing to install ground stations in Cuba and Egypt and then inviting other nations to join in a Soviet-sponsored comsat system, the USSR is clearly signaling that it does not intend to join Intelsat unless fundamental changes are written into the charter, or to permit US dominance in the international comsat field to go uncontested.

24. In the meantime, the USSR will probably try to exploit any convenient new opportunities to embellish its own stature in the international comsat field, wherever possible at the expense of the US. When the Interim Agreement is renegotiated in 1969, for example, some Intelsat members will almost certainly insist that it be altered to permit regional comsat systems. France and West Germany have already announced their intention to launch a joint regional system by 1970 to handle European traffic with Africa and Latin America, and Japan has indicated that it wishes to establish a system of its own for Asian traffic. The USSR is well aware of the growing sentiment for regional systems, and will almost certainly encourage their adoption as a development calculated to erode the US concept of a single global system and its commanding position in international comsat affairs. The USSR is likely to seek to establish a working arrangement with any European or Asian regional systems that might emerge, and it is possible that Moscow might contribute technical assistance to make such systems a reality.

25. New initiatives by the USSR in the less developed countries are also a distinct possibility. It is likely, however, that Moscow will exercise considerable caution and selectivity in its approach to these areas. In most of the less developed countries, Soviet telephone and telegraph requirements are extremely modest, and the TV viewing audience is small. In virtually all of them, acceptance of Soviet comsat technology would be contingent on Moscow's willingness to provide the necessary financing. Not the least important, the USSR will probably deem it desirable, before committing resources to projects, to estimate the probability that it can maintain a satisfactory relationship with the recipient country.

26. In the long run, the Orbita ground stations are likely to represent a considerably more significant addition to the Soviet telecommunications system than the TV center. Virtually all of the locations chosen for Orbita stations are of considerable strategic-economic importance to the USSR. Most of them are well beyond the reach of high-capacity communications trunklines currently in existence and they have thus been forced to use either unreliable high-frequency radio or very-low-capacity wirelines for outside communications. Although the Orbita ground stations will at first be confined to TV distribution, the USSR is believed capable of adding multichannel telephone/telegraph facilities whenever these capabilities are desired. It is likely that at least some of these ground stations will be equipped with such facilities within the next few years.

27. As shown in Figure 3, certain of the Orbita stations are located in close proximity to facilities of the major tropospheric scatter network now under construction in the Soviet northern and eastern regions. In all likelihood the troposcatter network, when completed, will be interconnected with the Molniya-Orbita satellite system. When this is accomplished, the USSR will have made a major forward step in modernizing its strategic telecommunications east of the Urals.

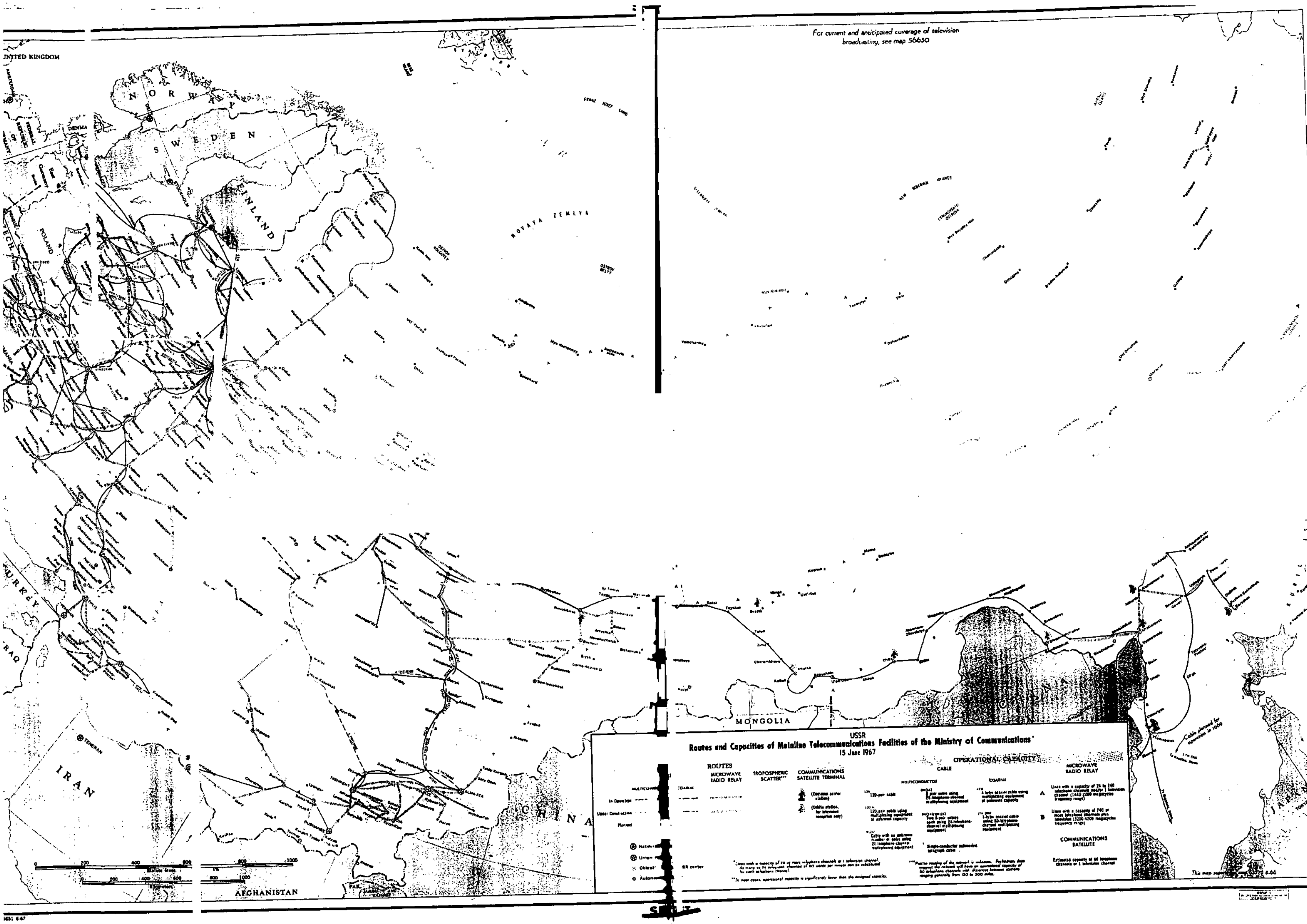

For current and anticipated coverage of television broadcasting, see map 56650
UNITED KINGDOM
NORWAY
SWEDEN
FINLAND
POLAND
NOVAYA ZEMLYA
FRANZ JOSEF LAND
NEW SIBERIAN ISLANDS
TURKEY
IRAQ
IRAN
TEHRAN
AFGHANISTAN
CHINA
MONGOLIA
JAPAN
TOKYO
Cable planned for operation in 1969
USSR
Routes and Capacities of Mainline Telecommunications Facilities of the Ministry of Communications*
15 June 1967
ROUTES
MULTICONDUCTOR
COAXIAL
MICROWAVE RADIO RELAY
TROPOSPHERIC SCATTER***
COMMUNICATIONS SATELLITE TERMINAL
In Operation
Under Construction
Planned
(Common-carrier station)
(Orbita station, for television reception only)
OPERATIONAL CAPACITY**
CABLE
MULTICONDUCTOR
COAXIAL
120-pair cable
120-pair cable using multiplexing equipment of unknown capacity
Cable with an unknown number of pairs using 24-telephone-channel multiplexing equipment
4-pair cable using 24-telephone-channel multiplexing equipment
Two 4-pair cables each using 24-telephone-channel multiplexing equipment
Single-conductor submarine telegraph cable
4-tube coaxial cable using multiplexing equipment of unknown capacity
2-tube coaxial cable using 60-telephone-channel multiplexing equipment
MICROWAVE RADIO RELAY
A Lines with a capacity of 24 to 240 telephone channels and/or 1 television channel (1440-2200 megacycles frequency range)
B Lines with a capacity of 240 or more telephone channels plus television (3200-4200 megacycles frequency range)
COMMUNICATIONS SATELLITE
Estimated capacity of 60 telephone channels or 1 television channel
*Lines with a capacity of 24 or more telephone channels or 1 television channel. As many as 24 telegraph channels of 60 words per minute can be substituted for each telephone channel.
**In most cases, operational capacity is significantly lower than the designed capacity.
***Precise routing of the network is unknown. Preliminary data suggest the network will have an operational capacity of 60 telephone channels with distances between stations ranging generally from 150 to 200 miles.
SR center
0 200 400 600 800 1000
Statute Miles
Kilometers
51451 6-67

Figure 1

USSR: Current and Anticipated Coverage of Television (TV) Broadcasting, June – November 1967